

Please add the following new claims 131-169 as follows:

A2
-131-

A method of forming a bonded vehicular assembly by adhering a load-bearing attachment member to a glass surface, said method comprising:

providing a substrate having a first glass surface and an opposing second surface;

providing an attachment member to be adhered to said first glass surface, said attachment member having a mounting surface;

forming a rapid set, rapid cure, two component urethane adhesive by mixing an isocyanate component ^{and/or} and a polyol component;

~~B~~ ^{SUB} ~~C2~~ depositing a layer of said adhesive on at least one of said attachment member mounting surface and said first glass surface;

positioning said attachment member and said substrate after said mixing of said components and said depositing of said layer on said mounting surface or said first glass surface such that said adhesive layer is disposed between and contacting said attachment member mounting surface and at least a portion of said first glass surface of said substrate without exposure of said attachment member on said opposing second surface of said substrate;

said adhesive setting up during a set up period while said adhesive layer holds said attachment member against movement resulting from the weight of said substrate and/or said attachment member and/or from application of a relatively slight force; and

allowing said adhesive layer to cure, said cured adhesive layer bonding said attachment member to said first glass surface prior to installation of said assembly in the vehicle.

A

A2
cont.

2 -132-

The method of claim 131 wherein said polyol component includes a high amine density plural amine compound in an amount of from about 2% to about 20% by weight of said polyol component; said method including mixing at least one filler agent in at least one of said isocyanate component and said polyol component, wherein said filler agent is in an amount of from about 15% to about 50% of the total weight of said polyol and isocyanate components.

2 3 -133-

The method of claim 132 including mixing said filler agent in an amount of from about 20% to about 30% of the total weight of said polyol and said isocyanate components.

2 4 -134-

The method of claim 132 including selecting said filler agent from the group consisting of silicates, silica, calcium carbonate, talc, and combinations thereof.

-135-

The method of claim 131 including providing said isocyanate component as compounds with isocyanate functionality and said polyol component as compounds with hydroxy and/or amino functionality, and wherein the ratio of isocyanate functionality to hydroxy and amino functionality is from about 0.9 to about 2.0.

5 6 -136-

The method of claim 135 including providing said ratio of isocyanate functionality to hydroxy and amino functionality from about 1.03 to about 1.4.

6 7 -137-

The method of claim 136 including providing said ratio of isocyanate functionality to hydroxy and amino functionality from about 1.1 to about 1.3.

48

05212206 4541000
05212206 4541000

Sub
C3

46-138-

A2
wt.
D

The method of claim 132 including providing said high amine density plural amine compound as a compound having an amine to carbon ratio of from about 1.0 to about 0.25:1 with the provisos that (i) the compound contains at least 3 amine groups except if said compound is aromatic then said compound ^{contains} at least 2 amine groups, and (ii) the compound contains from 2 to 24 carbon atoms.

89-139-

The method of claim 138 including providing said high amine density plural amine compound with a molecular weight of from about 115 to about 5000.

910-140-

The method of claim 139 including providing said high amine density plural amine compound with a molecular weight of from about 210 to about 290.

-141-

SUB C7

The method of claim 132 including providing said high amine plural amine as a reaction product of (i) at least one of pentaerythritol, glucose, and sucrose, and (ii) at least one member selected from the group consisting of ammonia and amino alkanes of the formula, $C_xH_nHN_2$, where x ranges from 1 to 20 and n is such that the alkane is saturated.

1112-142-

D

The method of claim 141 including providing x in a range ~~of ranges~~ from about 1 to about 6.

13-143-

The method of claim 131 further comprising, prior to depositing said adhesive, a step of:

depositing a layer of at least one of an adhesion promoter and a primer on at least one of said ^{first} glass surface and said attachment member mounting surface.

DA2
cont.
D
14 -144-
The method of claim 131 wherein the thickness of said adhesive disposed between said attachment member and at least a portion of said ^{first} glass surface is from about 0.01 mm to about 4.0 mm.

14 15 -145-
The method of claim 144 wherein the thickness of said adhesive is from about 0.25 mm to about 2.0 mm.

15 16 -146-
The method of claim 145 wherein the thickness of said adhesive is from about 0.5 mm to about 1.0 mm.

17 -147-
The method of claim 131 including performing said depositing step by robotic deposition.

18 -148-
The method of claim 131 including performing said depositing step by utilizing a dispense metering unit and a mixing unit.

18 19 -149-
The method of claim 148 including mixing said components with a static mix tube in association with a sequential reverse static mixer.

18 20 -150-
The method of claim 148 including delivering said adhesive through thermally controlled lines to said dispense metering unit.

1 21 -151-
The method of claim 131 including accelerating said curing by heating said adhesive.

A2
cont.

21 22 -152-

The method of claim 151 including selecting said heating from the group consisting of induction curing, infra red heating, and combinations thereof.

-153-

A method of forming a bonded vehicular assembly by adhering a load-bearing attachment member to a glass surface, said method comprising:

providing a substrate having a first glass surface and an opposing second surface;

Sub C5 providing an attachment member to be adhered to said first glass surface, said attachment member having a mounting surface;

forming a rapid set, rapid cure, two component urethane adhesive with an isocyanate component and a polyol component by metering a controlled volume of each component and mixing said metered volumes of said components;

robotically depositing a layer of said adhesive on at least one of said attachment member mounting surface and said first glass surface;

positioning said attachment member and said substrate after said mixing of said components and said depositing of said layer on said mounting surface or said first glass surface such that said adhesive layer is disposed between and contacting said attachment member mounting surface and at least a portion of said first glass surface of said substrate without exposure of said attachment member on said opposing second surface of said substrate;

 said adhesive setting during a set up period while said adhesive layer holds said attachment member against movement resulting from the weight of said substrate *and/or* said attachment member and/or from application of a relatively slight force; and

51

allowing said adhesive layer to cure, said cured adhesive layer bonding said attachment member to said first glass surface prior to installation of said assembly in the vehicle.

23 24 -154-

The method of claim 153 wherein said metering includes dispensing said isocyanate and polyol components with gear pump-based dispensing units.

24 25 -155-

The method of claim 154 wherein said gear pump based dispensing units include gears which are set to dispense said isocyanate and polyol components prior to said mixing at a ratio of 1.3 parts isocyanate component to 1 part polyol component.

24 26 -156-

The method of claim 154 wherein said mixing includes directing said components through a static mix tube in association with a sequential reverse static mixer.

26 27 -157-

The method of claim 156 including directing said components to said dispensing units, mix tube and static mixer with thermally controlled conduits whereby said components are maintained at about 95°F.

23 28 -158-

The method of claim 153 including mixing said metered volumes of said components with at least one of a static mix tube and a dynamic mix head.

23 29 -159-

The method of claim 153 wherein said metering includes maintaining the volume of each of said components constant for a specific flow rate such that the ratio of said isocyanate component to said polyol component remains unchanged as the total dispensed volume and flow rate change.

52

AJ
cont.

36 -160-

The method of claim 153 further including robotically applying at least one of an adhesion promoting compound and a primer to a portion of said first glass surface prior to positioning said attachment member and said substrate with said layer of adhesive therebetween.

31 -161-

The method of claim 160 wherein said robotic application includes applying said adhesion promoting compound in liquid form with a programmable robot fixtured with a liquid application device.

32 -162-

The method of claim 161 including programming said robot to obtain a piece of material from a dispenser, and wiping said material across said portion of said first glass surface while said material is loaded with said adhesion promoting compound.

33 -163-

The method of claim 162 including pumping a small volume of a silane based adhesion promoting compound to the surface of said material during said wiping such that a wet streak of said adhesion promoting compound is formed on said portion of said first glass surface, and allowing said adhesion promoting compound to flash off said first glass surface.

34 -164-

The method of claim 153 including robotically applying a primer composition to said portion of said first glass surface.

35 -165-

The method of claim 164 wherein said robotic application of said primer composition includes applying said primer composition in liquid form with a programmable robot fixtured with a liquid application device.

53